THAT WHICH IS CLAIMED:

1. A method for measuring resistivity of electromagnetic waves of the earth, comprising:

(1) establishing a linear coordinate system for observation and presetting initial parameters for capturing data,

wherein,

said linear coordinate system is based on an equation between a propagation frequency (F) and a stratum depth (H), said equation being $F=a+bK'/H$,

wherein,

F is the propagation frequency and its unit is Hz,

H is the strata depth and its unit is meter,

a is a surface-layer coefficient having a small and neglectable value,

b is a coefficient in regional stratum resistivity varied with the stratum depth, having a value of 0.1,

K' is a measured depth that is defined during the propagation of the electromagnetic wave in the strata,

wherein,

said initial parameters include a measurement starting depth (H1), a measurement ending depth (H2), and a sampling interval value (S);

(2) determining a depth coefficient (B) via the steps of:

(a) selecting a known drilling well in a region to be measured or a region adjacent to said region to be measured;

(b) performing exploration and measurement around said known drilling well to obtain a curve of electromagnetic wave resistivity;

(c) comparing said curve obtained in step (b) with a curve of the electromagnetic wave resistivity of the known drilling well to determine said depth coefficient (B),

wherein said comparing further comprises:

i. selecting a segment from said curve obtained in (b) and comparing with a corresponding segment of said curve of the electromagnetic wave resistivity of the known drilling well;

ii. determining a sampling interval S' using an equation of S' = (Hp2–Hp1)/(L2–L1),

wherein,

Hp1 is a depth of a characteristic point of a first well logging curve of the known drilling well and its unit is meter,

Hp2 is a depth of a characteristic point of a second well logging curve of the known drilling well and its unit is meter,

L1 is the number of a collection point of a newly measured curve of the electromagnetic wave resistivity which has similar characteristics as that of the characteristic point of the curve of the first well logging, and

L2 is the number of a collection point of a newly measured curve of the electromagnetic wave resistivity which has similar characteristics as that of the characteristic point of the curve of the second well logging; and

iii. responsive to the determination, determining said depth coefficient (B) through equations of (a) E= S'/S and (b) B= EbK',

wherein,

B is used to substitute the value of bK' in said equation of F=a+bK'/H, thereby resulting in an equation of H=BT, wherein T is a period and its unit is microsecond, wherein B is in a range of 0.001-1.000;

(3) calibrating a surface-layer depth coefficient (Ha) through the steps of:

(a) comparing said curve obtained in step (2)(b) with said curve of the electromagnetic wave resistivity of the known drilling well in respective segments to obtain a value of system error of depths at each characteristic point, said value of system error being Ha=Hd–Hc, wherein, Ha is a surface-layer depth coefficient, Hd is a depth of the characteristic point of electrical well logging of the known drilling well, and Hc is a depth of said characteristic point of the electromagnetic wave resistivity curve; and

(b) using said surface-layer depth coefficient Ha to calibrate a surface-layer depth for a measured depth using the curve of the electromagnetic wave resistivity, wherein the calibrated measurement starting depth is: H1j=H1±Ha;

(4) determining other parameters through the steps of:

(a) determining a measurement starting depth or a measurement ending depth for data capturing purposes based on pre-specified needs;

(b) selecting a number of sampling intervals depending on different conditions including:

i. for comparing different regional strata and tracking electrical interfaces of different, 5 meter, 10 meter or 20 meter being selected as said sampling intervals; and

ii. for tracking and detecting ore bed such as oil bed, coal bed and metal ore bed or a crack band, 0.2 meter, 0.5 meter or 1 meter being selected as said sampling intervals;

wherein,

a number of sampling points can be determined depending on different conditions including:

i. taking 8 points when the finishing depth is less than or equal to 1000 meter;

ii. taking 16 points when the finishing depth is less than or equal to 2000 meter;

iii. taking 32 points when the finishing depth is less than or equal to 4000 meter; and

iv. taking 64 points when the finishing depth is less than or equal to 8000 meter; wherein, the corresponding sampling periods being 128, 64, 32 and 16 respectively;

(c) determining a channel gain by selecting the first channel (CH1) and second channel (CH2) when a double sensor is used, and selecting the first to eighth channels (CH1–CH8) while a multi sensor is used;

(d) providing a lowpass filter by using an automatic tracing filter in shallow strata or where there is strong industrial power supply interference; and

(5) determining whether data captured through the steps (1) to (4) meets a quality standard required of original data, and responsive to the determination that the standard is met, recording said data in a data capturing, controlling and processing system, wherein said system is configured to:

(a) receive said measurement starting depth and said sampling intervals determined through the steps (1) to (4);

(b) determining proportions of a vertical coordinate with respect to a horizontal coordinate at an interface of said linear coordinate system for observation; and

(c) processing said data to produce a result graph containing data results.

2. The method of claim 1, wherein said known drilling well is selected to satisfy one or more conditions including: (1) the strata being representative, (2) data of resistivity well logging or drill well core being available, (3) an inclination angle of the strata being less than or equal to 15°, and (4) no interference of strong industrial electricity network on the earth.

3. An apparatus for measuring the electromagnetic wave resistivity of the earth, comprising:

an electric field sensor for receiving a signal of electric field intensity;

an magnetic field sensor for receiving a signal of magnetic field intensity;

at least two preamplifiers that are respectively connected to said electric field sensor and said magnetic field sensor;

a data capturing system in connection with said preamplifiers; and

a system for data capturing, controlling, data storing and processing,

wherein,

said data capturing system is connected to said system of for data capturing, controlling, data storing and processing via a data bus and a control bus,

wherein,

said system for data capturing, controlling, data storing and processing is configured for storing a H–F equation showing relations between a stratum depth (H) and a propagation frequency (F) and a ρ–H equation showing relations between an electromagnetic wave resistivity (ρ) and the stratum depth (H),

said system for data capturing, controlling, data storing and processing is further configured for processing data based upon said H-F equation and said p–H equation, and

said system for data capturing, controlling, data storing and processing is further configured for executing instructions for continuous measurement of electromagnetic wave resistivity of the earth.

4. The apparatus of claim 3, wherein said system said system for data capturing, controlling, data storing and processing comprises a laptop computer having a printer port.

5. The apparatus of claim 3, wherein said electric field sensor comprises at least one pair of lead electrodes or copper electrodes or other non-polarized electrodes.

6. The apparatus of claim 3, wherein said magnetic field sensor comprises multiturn annular induction coils, or multiturn annular induction coils with negative feedback of flux.

7. The apparatus of claim 3, wherein said preamplifiers include an input amplifier, a multistage trap, a lowpass filter, and an output amplifier.

8. The apparatus of claim 3, wherein said data capturing system is a high-speed data capturing system.